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ORIGINAL MEMOIRS.

THE RESULTS OF RADICAL OPERATIONS FOR THE CURE OF CARCINOMA OF THE BREAST.*

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IT is especially true of breast cancer that the surgeon interested in furnishing the best statistics may in perfectly honorable ways provide them. The most conscientious man may refuse to operate upon any but favorable cases, and, by performing an incomplete operation, exclude from his list of complete operations such bad ones as he finds himself operating upon. Or the pathologist on whom he relies may classify as carcinoma, tumors which on microscopic examination show dangerous spots—*i.e.,* a few epithelial cells here and there escaping into the stroma.

But you will concede that little notion of the value of an operative procedure can be gained unless some attempt be made to exclude or consider apart cancers so far advanced that, however radical the operation, only a portion of the disease can be removed.

The Results.—As effecting the ultimate result, the variety of the cancer, the time elapsed since its appearance, the degree of outlying involvement, the activity of the gland (lactation, age of patient), the thoroughness of the operation, are important factors.

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There will not be time in this discussion to consider in detail each of these influences. It is the particular wish of the Society, as I have understood it, to learn the results obtained by the modern, so-called complete, operation for the cure of cancer of the breast, and it affords me the greatest pleasure to express anew my obligation to Dr. Bloodgood for his efficiency and inexhaustible zeal in collating facts year after year for so many years, and to thank Mr. Schapiro for his invaluable assistance in tabulating from many points of view our results. I am exceedingly indebted also to the many physicians who have ardently assisted us in the search for data concerning their patients.

I ask your attention to the Tables. According to the plan of operation the cases have been divided into five groups; of these only three concern us to-day. In Group I are the cases in which, at the one occasion, the complete subclavian and neck operations were performed; in Group II, the cases in which at the first operation the complete pectoral or subclavin, and at a second the supraclavicular or neck part was performed; in Group III, those in which only the complete pectoral operation was done, the neck being unexplored. The small letters, *a*, *b*, *c*, *d*, indicate, approximately degrees of axillary involvement; *a*, signifying that the base or lowest part only of the axilla was implicated; *b*, involvement of the midaxilla as well as of the base; *c*, involvement, in addition, of the highest glands of the surgical axilla; and *d*, that the subclavian vein was involved or intimately adherent to the glands.

In the Tables here presented are included only the cases in which nothing less than the complete subclavicular operation was done and only those operated upon three or more years prior to the last news received of them. Excluding 65 cases in which, neeessarily, an ineomplete operation was performed there remain for study of the cases operated upon at the Johns Hopkins Hospital 232. The result in 18 of these we have been unable to determine. In calculating the percentage of cures untraced cases should be figured as dead of the disease.

In Tables II and III the ultimate results are considered

in relation to the glandular involvement, and in Table II in relation also to the particular operation performed. In 64 of the 232 cases glandular involvement was not discovered; nevertheless in 15 of these (23.4 per cent.) there was metastasis or recurrence of some sort sooner or later; in 6, metastasis three years after operation. It is interesting to note how late the

TABLE I

Carcinoma of the Breast.—Pathologic varieties.

	Number of cases.	Cured cases.	Per cent.
Cancer cysts	6	2 (1?)	33.3
Adenocarcinoma	32	24	75.0
Medullary carcinoma	25	12	48.0
Circumscribed scirrhus	28	13	46.4
Small infiltrating scirrhus	80	30	35.5
Large infiltrating scirrhus	39	8	20.5
Total	210	89	

Symbols Used in the Tables.

Complete axillary operation { Group I, Supraclavicular glands removed at 1st oper. / Group II, Supraclavicular glands removed secondarily. / Group III, Supraclavicular glands not removed.

Letters *a*, *b*, *c*, *d*, indicate degree of axillary involvement:
a, Base of axilla only.
b, Base and midaxilla.
c, Base, midaxilla and apex.
d, Veins intimately adherent.

metastasis occurred in these cases with undetected axillary involvement; another argument for wide operating. Forty-five of the 64, or 70 per cent., of the cases with undemonstrated glandular involvement are tabulated as cured, and 51 of the 64, or 80 per cent., were free for three years from signs of the disease. We must bear in mind, however, that surely in some and probably in many if not in most of the axillæ recorded as negative there was disease.

Of 110 cases with axillary involvement and negative neck, 27 cases, or 24.5 per cent., are cured for periods ranging from 16 to 3 years. Adding 11 untraced cases with axillary involvement to the 110 in which the result is definitely known,

reduces the percentage of cures in this category to 22.4 per cent.

The fact that in this country at least a number of the leading surgeons of the generation prior to mine made the pronouncement that they had not in their lifetime cured a single case of breast cancer notwithstanding the fact that they removed the entire breast, a liberal piece of skin, and after a fashion, some axillary glands, is strong presumptive evidence that in almost every instance the cancer, as then recognized, had entered the lymphatic vessels. As further proof of this is

TABLE II

Carcinoma of the Breast.—Cases operated upon 3 or more years prior to last news of them.

Ultimate result as affected by degree of axillary involvement.	Axilla only involved.				Axilla and Neck involved.				Totals
	a	*b*	*c*	Total	*b*	*c*	*d*	Total	
CURED, living 1906–1907	6	..	..	6	..	..	1	1	7
CURED, living in 1905	3	3	..	6	..	..	..	..	6
CURED, dead of other causes 3 years +	..	2	2	4	1	1	..	2	6
CURED, dead of other causes 3 years —	..	..	1	1	..	..	..	..	1
Actual cures	9	5	3	17	1	1	1	3	20
WELL 3 years, metastasis later	1	4	..	5	..	1	1	2	7
Cured 3 years and over	10	9	3	22	1	2	2	5	27
DEAD, local recurrence	1	3	3	7	1	6	1	8	15
DEAD, regionary recurrence	5	4	6	15	2	7	2	11	26
DEAD, internal metastasis	5	13	5	23	1	9	5	15	38
Cases not cured	11	20	14	45	4	22	8	34	79
Cured 3-year cases	10	9	3	22	1	2	2	5	27
Postoperative deaths	..	..	..	3	..	..	..	1	4
Untraced	..	..	..	11	..	..	..	3	14
No data as to extent of axillary involvement	..	..	..	43	..	..	..	1	44
	21	29	17	124	5	24	10	44	168

our observation that even in the cases with microscopically negative axilla, and notwithstanding our extensive operation, there is death from metastasis in 23.4 per cent.

Fortunately we no longer need the proof which our figures so unmistakably give that the slightest delay is dangerous and that, other things being equal, the prognosis is quite good in the early stage of breast cancer, two in three being cured, and bad, three in four succumbing, when the axillary glands are demonstrably involved. We find encouragement for our operative

TABLE III

Carcinoma of the Breast.—Cases operated upon 3 or more years prior to last news of them.

Ultimate result as affected by axillary and neck involvement.	Glands of axilla and neck negative.				Glands of axilla positive, glands of neck negative.				Glands of axilla and neck postive.			Totals.
	I.	II.	III.	Total	I.	II.	III.	Total	I.	II.	Total	
CURED, living: heard from in 1906-1907	4	1	20	25	4	..	5	9	..	1	1	35
CURED, living: heard from in 1905	4	2	7	13	4	..	3	7	..	..	..	20
CURED, dead of other cause more than 3 years post op.	4	..	3	7	4	..	3	7	1	1	2	16
CURED, dead of other cause less than 3 years post op.	..	..	..	..	1	..	3	4	..	..	..	4
Cases actually cured	12	3	30	45	13	..	14	27	1	2	3	75
CURED 3 years after operation, metastasis later	1	..	5	6	3	..	4	7	1	..	1	14
Cases cured not less than 3 years	13	3	35	51	16	..	18	34	2	2	4	89
DEAD, local recurrence	..	..	..	..	5	..	11	16	6	4	10	26
DEAD, regionary recurrence	1	..	3	4	13	1	7	21	5	5	10	35
DEAD, internal metastasis	2	..	3	5	15	1	23	39	14	2	16	60
Cases that have not been cured	3	..	6	9	33	2	41	76	25	11	36	121
Cases cured 3 years and more, as above	13	3	35	51	16	..	18	34	2	2	4	89
	16	3	41	60	49	2	59	110	27	13	40	210
Postoperative Mortality	..	..	..	..	2	..	1	3	1	..	1	4
Untraced	..	..	4	4	3	..	8	11	3	..	3	18
	16	3	45	64	54	2	68	124	31	13	44	232

and laboratory labors and to increased endeavor quite as great from the relatively poor results obtained in the advanced cases as from the more favorable outcome in the cases in which no involvement of lymphatic glands was detected.

The neck operation was done in 101 cases primarily and in 18 secondarily. In 113 of the 232 cases the supraclavicular operation was omitted. In 44 patients the glands of the neck as well as of the axilla were involved. Three of these, or 7 per cent., were, it seems, definitely cured. One is still living, twelve and a half years since the operation; a second lived six years and died of diabetes; a third, three and three-quarter years without signs of return, died of acute pneumonia; and in a fourth, after three years of apparent freedom, the disease re-manifested itself. We have reason to be quite certain that there

TABLE IV

Carcinoma of the Breast.—Study of cured 5-year cases. (To January, 1907.)

	Cases.	P.O.D. and lost.	No. of cases.	Cured, living.	Cured, dead.	Metast. after 5 years.	Total.	Per cent.
Group I.....	96	8	88	13	6	5	24	27.27
Group II.....	16	..	16	3	1	1	5	31.25
Group III	92	5	87	23	3	4	30	34.48
	204	13	191	39	10	10	59	30.89

was also involvement in some of the necks reported as negative.

Before accepting the statement of any one that he has cured a case of breast cancer with neck involvement, incontrovertible proof should be demanded. I confess that even if the microscopic findings were confirmed by an able pathologist I should still feel that an error might have occurred, for example, in the labeling of the specimen. The naked eye diagnosis of the surgeon should count for nothing unless he is a sound pathologist and the macroscopic findings are specifically detailed. Inflammation may produce appearances in lymphatic glands quite indistinguishable macroscopically from carcinoma, whether medullary or scirrhous. If the deposit is described as sharply outlined against the more normal portions of the gland, particularly if cortical, the observation deserves consideration. We

should demand as further proof of cure in these positive neck cases that the patient live at least five years after the operation, or negative autopsy findings, a year or perhaps even two years thereafter. With these stipulations fulfilled I should still be sceptical as to the cure. Cancer was diagnosed both macroscopically and microscopically in the three cases of cure claimed by us. But even without the proof which we offer, it is, I think, incumbent upon the surgeon to perform in many cases the supraclavicular operation. He should surely perform it, barring, of course, special contraindications, (1) in all cases with palpable, operable, neck involvement; (2) when the apex of the surgical axilla is involved. When midaxillary involvement is demonstrable at the operation apical implication is almost certain, and hence (3) in these cases also the neck should be typically cleaned of its lymphatics, as high, at the very least, as the bifurcation of the carotid.

We find ourselves for the past two years again performing the neck operation in most cases. We omit it in hopeless cases, in most "duct cancers," and in some carcinomata of emphatically adenomatous type in which the axilla at operation is not macroscopically involved.

To determine the relation of supraclavicular to subclavicular involvement detailed observations at the operating table with especial reference to this point must be made; and almost endless laboratory work is necessary. To be able to assert with any degree of positiveness that the axilla and neck are negative involves infinite toil. The findings at operation must be recorded on charts designed especially for this purpose; and a laboratory enthusiast of a rare type is indispensable.

For the greater convenience of the reader the following summary is given. Of the 232 cases considered, 18 remain untraced. Of the 210 traced cases we accept as *cured:*

35 cases reported living in 1906–1907	16.6 per cent. of 210
20 cases reported living in 1905	9.5 per cent. of 210
16 cases known to have died of causes other than carcinoma of the breast three or more years after the operation	7.9 per cent. of 210

4 cases dead of other disease, less than three years post op., in which the cure was demonstrated by autopsy ..... 1.9 per cent. of 210

Total, cured, 75 cases = 32.3 per cent. of 232, and 53.6 per cent. of 210

In 14 cases metastasis appeared after three years; in one instance manifesting itself as late as eight years and in two instances more than six years after the operation. Thus, 89 cases (42.3 per cent. of 210, and 38.3 per cent. of 232), were apparently cured for three or more years.

In the 210 traced cases the condition of the axilla and neck as regards glandular involvement was as follows:

		Cured.	Per cent.	Cured 3 years.	Per cent.
Axilla and neck negative	60 cases	45	= 75	51	= 85
Axilla positive, neck negative	110 cases	27	= 24.5	34	= 31
Axilla and neck positive	40 cases	3	= 7.5	4	= 10
Total	210				

The Mortality.—Four of the 232 patients died in the hospital, a mortality of one and seven-tenths per cent. The group apportionment of the deaths is as follows:

Group I; .....in 101 cases, 3 deaths = 3 per cent.
Group II; .....in 18 cases, 0 deaths = 0 per cent. } 2.5 per cent.
Group III;.....in 113 cases, 1 death = .88 per cent.

Thus it would seem, without particulars, that the neck operations were responsible for the greater mortality, Groups I and II yielding a two and one-half per cent. death rate, and Group III, in which the neck operation was omitted, a mortality of hardly one per cent. But two of the deaths in the neck cases were clearly due to an avoidable error, quite independent of the operation. These two patients, operated upon just twenty-four hours apart, were convalescing normally until the first dressing, which was made in both cases the same day and hour, respectively eight and nine days after the operation. Within a few hours of the dressing each patient had a chill with high temperature. The skin grafts and wound, which in each had a perfectly normal appearance at the time of the dressing,

rapidly acquired the features so characteristic of general infection. Excepting these two cases, the mortality in the patients with neck operation becomes .99 per cent., only a shade more than in the cases with axillary operation alone, in which it is .88 per cent.

Recurrence and Metastasis.—We know little of what is going on under the skin along the fascial planes even when our attention is drawn to the disease by the appearance, here and there, of cutaneous or subcutaneous nodules at long distance from the primary tumor. I recall distinctly one case and less distinctly one or two other cases of intestinal and peritoneal cancer in which general metastasis was believed, erroneously I think, to have occurred by way of the blood-vessels, although the only evidence of metastasis were numerous subcutaneous and fewer cutaneous nodules situated chiefly over the abdomen and confined altogether to the trunk or to the trunk and its immediate vicinity. Although it undoubtedly occurs, I am not sure that I have observed from breast cancer, metastasis which seemed definitely to have been conveyed by way of the blood-vessels; and my views as to the dissemination of carcinoma of the breast accord so fully with Handley's [1] that I may, in justice to him, who has formulated and expressed them so well, quote now and again from his admirable chapters. "In showing that cancer cells in the blood excite thrombosis, and that the thrombus as it organizes usually destroys or renders them harmless, Goldmann and Schmidt seem to have established a fact of primary importance and one which is strongly opposed to the embolic theory as applied to carcinoma." We believe with Handley that cancer of the breast in spreading centrifugally preserves in the main continuity with the original growth, and before involving the viscera may become widely diffused along surface planes.

Statistics obtained from many sources indicate that bone metastasis in cases of breast cancer occur, as phrased by Handley, very rarely in areas not actually invaded by the subcutane-

[1] Handley. Cancer of the Breast and its Operative Treatment, London, 1907, (W. Sampson).

ous nodules. As is well known, the sternum, ribs, spinal column, femur, and humerus, and perhaps also the skull, are the bones most frequently attacked in cases of breast cancer. Distal to the elbow and knee the bones escape, except in rare instances, cancerous invasion. We have in our cases no record of bone involvement below these joints. "The liability of a bone to cancerous metastasis increases with its proximity to the site of the primary growth." Figs. A and B (Handley) graphically represent the coincidence of the areas liable, respectively, to bone metastases and to subcutaneous nodules.

In that metastases occur both in general and in the special case only in bones which lie in the area invaded by subcutaneous nodules there is signified a relationship between the two, "between the bone deposits and the subcutaneous nodules." The dissemination probably takes place by way of the lymphatics—not by the blood-vessels—and the disease holds together without important interruptions. It permeates to the bone rather than metastasizes to it, and, via the lymphatics, along fascial planes. Much evidence has been adduced by others, and most convincingly by Handley, to indicate that the centrifugal spread of breast cancer takes place primarily in the plane of the deep fascia. If the bones are invaded by way of the lymphatic plexus of the deep fascia the first attack should fall on the spot nearest the deep fascial lymphatics—nearest the surface; in the case of the femur, at the great trochanter; of the humerus, at or below the insertion of the deltoid; and such seems actually to be the case.[2]

There is then a definite, more or less interrupted or quite uninterrupted, connection between the original focus and all the outlying deposits of cancer, "the centrifugal spread annexing by continuity a very large area in some cases." Thus the liver may be invaded by way of the deep fascia, the linea alba and round ligament,[3] "the brain by the lymphatics accompanying the middle meningeal artery."

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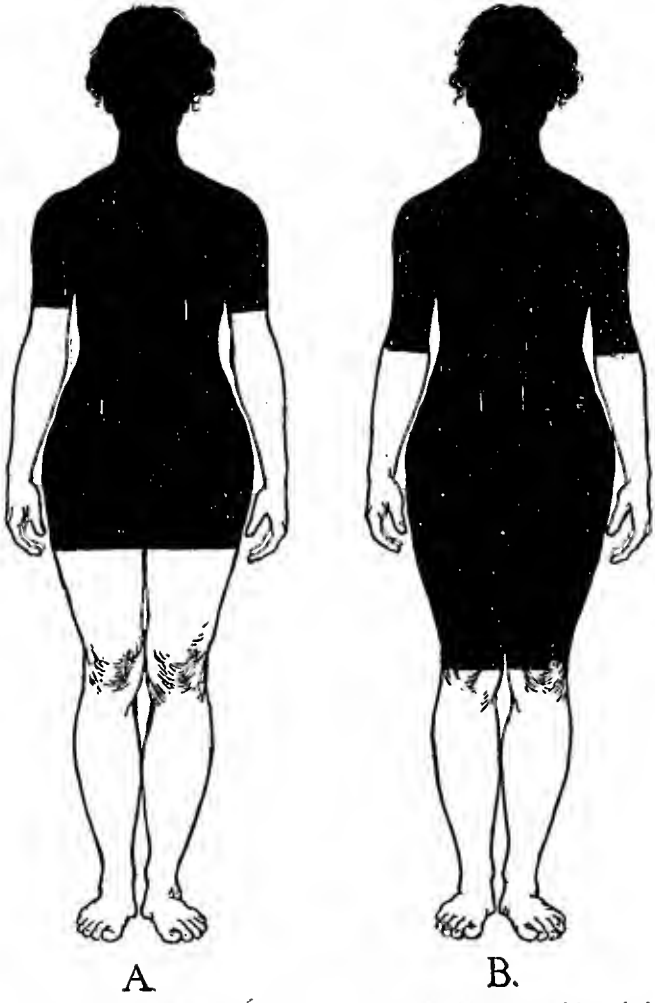
[2] Handley, loc. cit.

[3] Handley furnishes convincing proof that the liver may be invaded via the linea alba and round ligament.

CHART I.



"Diagrams showing the maximal distribution areas of subcutaneous nodules and of metastases in bone in cases of mammary carcinoma. The black area in A is the area liable to subcutaneous nodules, that in B is the area within which bone metastases occur." Handley.

Cancer Cysts.—At some other time we may consider in detail the cancer cysts, but at present can only speak of the difficulty in recognizing them and the hopelessness of the prognosis if their character is not suspected by the surgeon at the operating table. "By the surgeon," I say, for unless the operator espies the hardly discernible changes in the delicate wall of the cyst it will not occur to him that it is worth while to submit a piece for immediate examination by the pathologist. If he is able to recognize the barely perceptible thickening, the slight lack of lustre, the faintest possible difference in color and in texture, he will probably make the diagnosis without microscopic assistance. Blood-stained fluid should arouse one's suspicions, but there may be no staining of the cyst-content. Every portion of the wall should be scrutinized, particularly the base of the not infrequent papilloma. The prognosis is quite hopeless if the diagnosis is not made at the operating table. I failed to make it in the first case and possibly in the second, although I have the impression that my suspicions were aroused in the second case, operated upon many years ago. In all the clinically undiagnosed cases the nature of the cyst was soon discovered by the microscope, and in all, more or less promptly, a second operation performed; but, alas, performed in vain. The cases saved are only those in which at the operating table the correct diagnosis was made. Further proof of the necessity of making the correct diagnosis at the time of operating is not needed. The prognosis in these cases of cancer cyst, the earliest recognizable cancers, perhaps, is excellent if the nature of the disease is perceived at the table; hopeless, so far as our statistics are concerned, if it is not. Do we require more definite proof than this that the first operation is responsible for the inefficacy of the second? The precise means by which the first renders the speedily following second operation futile is not perhaps altogether clear. The partial operation (the first) certainly disseminates the cancer, which the complete operation (the second) in the primarily diagnosed cases of cancer cyst has not in our experience done. Furthermore, dissemination takes place probably by routes not already

travelled by the cancer cells and not commonly travelled by them in the early unoperated cases. Probably by these unusual routes the disease soon reaches parts outside the domain of the operation and so escapes eradication.

The Diagnosis.—It is not expected of me in this report to touch upon the diagnosis of breast cancer; furthermore it is considered a trite subject, one to which little can be contributed. But for me interest in the diagnosis of difficult cases increases, and with it the conviction that, really, something remains to be said and done. It well repays the experienced surgeon to spend perhaps an hour in the examination of certain breasts. The diagnosis has usually been exceedingly and unfortunately simple. But women are now presenting themselves more promptly for examination, realizing that a cure of breast cancer is not only possible, but, if operated upon early, quite probable. Hence the surgeon is seeing smaller and still smaller tumors, cancers which give not one of the cardinal signs. About as difficult a case as any, excepting, of course the adenoma in a transitional stage, is a tiny retromammary adenocarcinoma or a colloid carcinoma in a breast covered with one or more inches of fat. If in such a case there should be no shortening whatever of the trabeculæ the diagnosis could hardly be made. The fat on pressure being elastic and the tumor so deep, the differential diagnosis from cyst might not be possible. But given even very slight shortening of the trabeculæ from tumor to skin, this fact might be determinable by making both breasts take the widest possible excursions on the chest wall, under the skin. The faintest conceivable trace of a difference on the two sides, in a minor pectoral crease, for example, may suffice for the diagnosis. Raising the skin over the tumor with the fingers to ascertain the relative length of the trabeculæ is too crude a method, and in no case serviceable unless the tiny growth is directly under or close to the nipple; for if the test applied in this way gives a positive result there is so much shortening of the trabeculæ that the slightest displacement of the breast would reveal it. I have occasionally noticed that of my assistants, perhaps one

or two will see a trace of asymmetry in the skin tug on extreme displacement which the others are wholly unable to make out; and I have more than once in just such case of difference of opinion performed the complete operation for very small, deep-seated cancers without exploratory incision. Frequently there is no sign but this almost imperceptible suggestion of pull, which, when the faintest possible, is of course elicited by dislocation in one direction only. This sign, however slight, is all that is needed for the diagnosis. Practice in the examination of such cases, doing one's utmost to get such evidence, is most highly rewarding. Any breast if displaced far enough will, of course, tug, in a way, on the skin; it is only under the most accurate control with the other breast that its significance in difficult cases may be estimated. It will seem to some that I am wasting many words to tell what every surgeon knows; but to me, at least, the extreme possibilities of this test were not fully realized a decade, perhaps, ago, and each year I believe it develops a little in refinement. The ability to determine elasticity, the elasticity of a small cyst, as hard, almost, as bone, comes to some earlier than to others; but to me, if it has come at all, it came only with long practice. In the breast a difficulty arises from the fact that a tense cyst makes itself felt such considerable distance in the surrounding mammary tissue, particularly if the breast is very fibrous. A nodule seemingly as large as a pea to palpation may be caused by a cyst no larger than a small pin-head, and a cyst almost microscopic may, by the pressure which it exerts in the dense fibrous tissue of the breast, occasion a definitely palpable, quite circumscribed hardness. It should impress the uninitiated to witness the ability of the demonstrator to diagnosticate with the fingers through considerable fibrous tissue these hardly visible cysts yielding on puncture the tiniest fraction of a drop. The general nodular feel of a fibrous mamma in situ or on a tray depends largely upon small to tiny foci of parenchyma which are most readily recognized by the finger when a little fluid (the minutest particle suffices) is retained under tension.

The firm, circumscribed pressure exercised in the effort to determine the elasticity of a tumor occasionally ruptures, I believe, the capsule of a fat lobule. In three instances, while making this test, a peculiar sensation has been communicated to the fingers which I attributed in the first instance, and with considerable apprehension, to rupture of a cystic portion of a colloid cancer which I believed to be under examination. The cause of this perfectly unmistakable sensation which must, one feels, be accompanied by a nonaudible sound (onomatopoetically, geräusch), we have been unable definitely to determine. It is due to the crushing or rupture of something, certainly not of a cyst, and I have noted this sign only in fat people.

The size of the breast relative to that of the other side should of course be determined; but it is important to note most carefully the relative amount of uninvolved mammary gland remaining—relative to the amount in the other breast and to the size of the new growth.

Given a carcinoma, say one-half or one-quarter as large as the palm of the hand, if this tumor has grown not at all or little at the expense of the breast—and this is ascertained by making the comparison just advised—the prognosis is relatively good; for the tumor in such case is quite surely of a definitely adenomatous type and not of the scirrhous variety.

There can be little doubt, in my opinion, that a scirrhous cancer represents only a part of what has existed. The struggle against the cancer cells, resulting in fibrous tissue production, is quite surely not always futile, and when the minute foci of cancer epithelium have been destroyed, the new fibrous tissue may in part be absorbed also. Thus the scirrhous disease may be active and metastasis take place a long time before the visible or palpable tumor is developed. It would undoubtedly be possible for the expert to discover of the scirrhous growth earlier stages than he encounters, but unfortunately the tumor must first be recognized by the patient, and a scirrhous cancer large enough to attract her attention has quite surely already gone afield. Our problem, therefore, is to discover these tumors before the afflicted one can do so. Shall we let women

know that a dangerous process may be going on which they cannot detect, and keep them in a constant state of apprehension, or shall we encourage them to seek "expert" advice which may be insufficiently expert, and expose them to the annoyance of repeated and useless examinations, each of which for only a brief period, if at all, would bring a measure of reassurance?

The Operation.—Though the area of disease extend from cranium to knee, breast cancer in the broad sense is a local affection, and there comes to the surgeon an encouragement to greater endeavor with the cognition that the metastases to bone, to pleura, to liver, are probably parts of the whole, and that the involvements are almost invariably by process of lymphatic permeation and not embolic by way of the blood. Extension, the most rapid, taking place beneath the skin along the fascial planes, we must remove not only a very large amount of skin and a much larger area of subcutaneous fat and fascia, but also strip the sheaths from the upper part of the rectus, the serratus magnus, the subscapularis, and at times from parts of the latissimus dorsi and the teres major. Both pectoral muscles are, of course, removed.

A part of the chest wall should, I believe, be excised in certain cases, the surgeon bearing in mind always that he is dealing with lymphatic and not blood metastases and that the slightest inattention to detail, or attempts to hasten convalescence by such plastic operations as are feasible only when a restricted amount of skin is removed, may sacrifice his patient.

It must be our endeavor to trace more definitely the routes travelled in the metastases to bone, particularly to the humerus, for it is even possible in case of involvement of this bone that amputation of the shoulder joint plus a proper removal of the soft parts might eradicate the disease. So, too, it is conceivable that ultimately, when our knowledge of the lymphatics traversed in cases of femur involvement becomes sufficiently exact, amputation at the hip joint may seem indicated. The operation might with advantage be considered in greater detail, and I hope in the near future to have the opportunity to do so.

As to the closure of the wound I should not care to say "Beware of the man with the plastic operation." The surgeon should familiarize himself with the principle of the one or two particular plastic operations which make the best use in the simplest manner of any redundant or easily glideable skin, as of the axillary flap, that he may be prepared in any case to utilize in combination with skin grafting such feature as seems applicable. But to attempt to close the breast wound more or less regularly by any plastic method is hazardous and, in my opinion, to be vigorously discountenanced. The oval flap, whatever the direction of its long axis, removes, so far as the cure of the disease is concerned, a circle of skin whose diameter is not greater than the short axis of the oval. I still believe in the removal of a very large circle of skin and endorse the remark of my ex-house surgeon, Dr. Follis, that the operator whose duty it is to close the wound should not be entrusted with the planning of the skin incision. Skin grafting well done consumes few minutes; as a method it adds little, if at all, to the period of convalescence except so far as very early arm movements are concerned, and nothing to the mortality. I grant that to cut the grafts well, much practice is necessary, and the skill acquired by some is so great that I intrust this part of the procedure to the dexterous house-surgeon. Thiersch grafts from the thigh are commonly cut as large as a good-sized hand. One such graft may be sufficient to cover the defect; more than two large grafts are not often required. The silver foil dressing for the grafts, used at the Johns Hopkins Hospital for so many years, seems quite ideal.

Occasionally, and happily with increasing frequency, an incision for diagnostic purposes has to be made. Great care should be exercised to make these exploratory cuts no deeper than is absolutely essential. Rarely is it necessary to carry the knife *into* a cancer, for on exposure of the subcutaneous fat the tell-tale drawing of the fibrous tissue is revealed; sometimes the fat must be cut into for a little distance. If the growth is not malignant the incision should usually pass through it.

Caustics.—I am indubitably convinced that the local and regionary recurrences after incomplete operations, which come as a rule with amazing rapidity when the knife has been used, are, to say the least, relatively late in making their appearance when chemical or actual cauterization has been employed. I have several times had occasion to operate upon cancers which had been vigorously and repeatedly treated with caustics, and to note the comparatively admirable condition, the freedom from cancer permeation, of the surrounding tissues and of the axilla; whereas, after incomplete operations with the knife the local manifestations of recurrence were almost invariably deplorable and the prognosis, of course, invariably hopeless.

It was my practice at one time in making the exploration in doubtful cases to excise a portion of the breast tumor with the Paquelin cautery to prevent the wound-inoculation which I feared might take place if the knife were used. The excision of a specimen for macroscopic or microscopic examination is never resorted to except just before operation. If the actual cautery for any reason is not used, the wound is immediately cauterized with carbolic acid. All incomplete operations for cancer should, when feasible, be made with the Paquelin or actual cautery.[4] The Paquelin is ideal for the removal of cutaneous nævi, particularly of the melanotic variety. I doubt if any melanotic tumor of the skin should be removed with the knife.

Cancerous Axillary Glands with Non-demonstrable Cancer of the Mamma.—I have twice seen extensive carcinomatous involvement of the axilla due to mammary cancer which, latter, in neither instance became demonstrable for a considerable period after the axillary glands had attained conspicuous dimensions. In each case the "axillary tumors" had been removed, in one of them a year before and in the other per-

[4] I was greatly pleased to note, during a recent visit to Rochester, Minnesota, that Drs. William and Charles Mayo make extensive use of the actual cautery in operations upon cancers incurable by the knife, and to have them indorse the view, so long maintained by me, that there is relative immunity from local metastasis with the employment of the cautery.

haps two years prior to my first examination, which, though made in the most careful manner, failed to find the slightest evidence of cancer of either breast. In the course of a few months, thereafter, the mammary disease manifested itself in both patients.

A third patient was operated upon, for enlarged glands of the axilla about two and a half years before she consulted me concerning the local, axillary, recurrence of the disease, and more especially to be relieved of severe neuralgic pains in the arms and legs. In this woman I found a large mass of axillary glands which proved later to be cancerous, but nothing in the breast except a quite indefinite parchment-like induration at the base of the nipple which was retracted not at all or merely to a barely appreciable degree. With performance of the complete breast operation the pains in the extremities which distressed her greatly, vanished.

Disseminated Pains Which Would Seem to be Caused Occasionally by the Toxines Generated in the Course of the Growth of Cancer.—Distressing pains in the knees, the legs, the back, the arms, so severe and so located as to suggest cancerous involvement of the vertebræ have in two cases operated upon by me at the Johns Hopkins Hospital disappeared on removal of the growth which in one instance was large, ulcerous and foul smelling, in the other (the case cited at the end of the preceding paragraph), consisted merely of a large mass of glands in the axilla.

Reactionary Œdema in Mammary Cancer.—Quite recently I was privileged to see a condition of board-like œdema limited in a general way to the pectoral region of one side. There was no definitely appreciable abnormality of the mamma other than the œdema in the area of which it was included; and not until perhaps six months after the first manifestation of this œdema was there the least evidence of neoplastic disease of the breast. Then, as in my experience, is usually the case in the presence of excessive œdema of reaction, the cancer made very rapid strides.